June 1965 GA-724 Brief 65-10172

NASA TECH BRIEF

Aluminum Alloys Protected Against Stress-Corrosion Cracking

The problem: To minimize stress-corrosion cracking in aluminum alloys subjected to sustained surface stresses and corrosive environments.

The solution: Appropriate surface treatments and application of protective coatings.

How it's done: The most effective protection is obtained by applying a topcoat of epoxy-polyamide paint to shot-peened or 5- to 7-mil-thick metallized surfaces of the aluminum alloy. Satisfactory temporary protection is afforded by a 3- to 4-mil-thick electroplated galvanic coating, or a topcoat of paint containing epoxy-polyamide or polyurethane resins. The epoxy-polyamide paint is the better of the two paints for this application and can be used on unprimed surfaces. Care is necessary to prevent breaking or scratching the paint film. When severe corrosive environments are not encountered, shot peening alone can provide good surface protection, provided all exposed surfaces are treated.

Notes:

1. Anodic films and zinc-rich paint were found to be the least effective coatings for preventing stress-corrosion cracking.
2. Further information on the control of stress corrosion in aluminum alloys is given in ALCOA Technical Paper No. 17, "Resistance of Wrought High-Strength Aluminum Alloys to Stress Corrosion", Aluminum Corporation of America, Pittsburgh, Pennsylvania. Inquiries may also be directed to:
   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama, 35812
   Reference: B65-10172

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: ALCOA Research Laboratories under contract to Marshall Space Flight Center (M-FS-235)